USS Freedom Successful Replacement of Main Propulsion Diesel Engine

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SAN DIEGO (NNS) -- Southwest Regional Maintenance Center (SWRMC) worked with General Dynamics National Steel and Shipbuilding Company (NASSCO) and Bath Iron Works (BIW) to successfully remove and replace the No. 2 main propulsion diesel engine on littoral combat ship USS Freedom (LCS 1).

The effort began at Naval Base San Diego, Feb. 25, with the removal of the engine and concluded March 10 with the installation of its replacement.

Freedom experienced the engine failure while participating in the Rim of the Pacific Exercise (RIMPAC) late August 2016. After scheduling an emergent availability for late October, SWRMC, NASSCO and BIW had less than three months to develop a plan to repair the engine.

With many possible repair solutions to consider, the engineers were able to devise a solution which would preserve the structural integrity of Freedom, as well as maximize cost and time savings for the repair - the 55-ton engine would be removed and replaced through a precisely cut opening in the side of Freedom's hull.

Michael Giza, senior engineer, BIW, and his team generated the drawings for the space, including details of the locations of the cuts and supports for Freedom while the work was being completed, and developed the innovative plan for removing and replacing the engine.

"Prior to dry-docking, contractors started removing as much of the equipment as they could out of the engine room through the stairwells and hatches," said Lt. Gregory S. Baird, project officer, SWRMC Waterfront Operations. "As soon as Freedom docked, a small hole was cut in her side to access the engine room to continue removing interferences and making a clear path to the engine. As soon as all of the interferences were moved out of the way, the next biggest evolution was to remove the large hull cut in the side of the ship."

Once Freedom was prepped, the team raised the engine three feet before bolting steel channels outfitted with Hillman rollers -- creating a "skateboard" -- under it. They used winches and 37-foot steel beam tracks to roll the engine out of Freedom's hull. When the engine was clear of the ship, it was hooked to cranes and hoisted out of the graving dock. The same method was used in reverse less than two weeks later to put the new engine on Freedom.

Kurtis Womack, area manager, NASSCO, praised Giza, "His work and planning while generating the drawings made the process as seamless as possible on the day of execution. The drawings were so precise, there was about an inch or two of space on one side of the engine as it was removed from the cut."

The team also relied on Womack's engineering experience with hull cuts and repairs during the process, especially with supporting Freedom and the cranes during the removal and replacement of the large engine. In addition, Womack oversaw the cataloging of all parts removed to make putting them back on Freedom as easy as possible.

SWRMC served as the naval supervising activity for the effort and ensures all required work is inducted, issued, executed, documented, reviewed and certified. They also ensure proper completion of all work in accordance with SWRMC's mission "to provide superior ship maintenance, modernization, technical support and training to the Pacific Fleet."

The planning, engineering, and execution of the engine replacement on Freedom are admirable examples of a successful collaboration between the SWRMC, NASSCO and BIW.

Freedom is the lead ship in the Freedom-class of LCSs and a fast, agile, and networked surface combatant, optimized for operating in shallow water. The primary missions for the LCS include countering diesel submarine threats, littoral mine threats, and surface threats such as small surface craft attacks, to assure maritime access for joint forces. Freedom is expected to undock in early May.

For more information, visit www.navy.mil, www.facebook.com/usnavy, or www.twitter.com/usnavy.

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